Original Research Article

Assessment of Risk Factors for Overweight and Obesity: A Cross-Sectional Study among Rural School Going Children in Hooghly District, West Bengal

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ABSTRACT

Introduction: Intermediate school children are in the transition phase from adolescent to adulthood. This age group is known for experimentation and vulnerability to adopt lifestyles predisposing to non-communicable diseases.

Method: A pre-designed and pre-tested questionnaire was used in class-room setting to collect information from students regarding presence of risk factors of non-communicable diseases. The respondents were also subjected to anthropometric measurements and blood pressure examination using standard operating procedures.

Results: A total of 761 students of class VI-XII participated in the study of which 61.4% were boys and rests were girls. Increased body mass index among boys and girls were 12.6% and 11.6% were respectively. In Bivariate analysis fast food intake (>3 times/week) (OR=1.92), less physical activity (OR=1.86), high blood pressure (OR=2.53) were significantly associated with increased body mass index. In Multivariate analysis fast food intake (AOR=1.83), less physical activity (AOR= 1.94), high blood pressure (AOR=2.40) remains significant predictor.

Conclusion: Therefore, it is strongly felt that all efforts must be made to obviate the risk factors of overweight and obesity among the general mass at a very early age. Those efforts must be well structured, scientifically systematized and socially implementable.

Key Words: Children, BMI, Risk factor, Rural school.

INTRODUCTION

Non-communicable diseases are increasingly becoming a disease of poor and younger segments of population. Non-communicable diseases cause significant morbidity and mortality both in urban and rural population, with considerable loss in potentially productive years of life.

Any attempt at reducing the incidence of non-communicable diseases should include in its fold children too, as they are at an impressionable age and can be motivated to make appropriate healthy modifications and in turn they can influence the community at large. Intermediate school children are in the transition phase from adolescent to adulthood. This age group is known for experimentation and vulnerability to adopt lifestyles predisposing to non-communicable diseases.

For this it was very much justified to conduct this study among school students to assess the risk factor of overweight and obesity, the result of which would play a long way in implementing apt corrective measures by the health policy makers and

administrators through structured primitive, preventive and curative health care services for the rural poor. The co-education higher-secondary school has over thousands of students of different demographic backgrounds. This is the best way to study risk factors for overweight and obesity among children.

MATERIAL AND METHODS

Among the rural block of Hooghly district Tarakeswar was chosen due to its proximity to the megacity of Kolkata which influences the lifestyle pattern and other behavioural characteristics of the people residing in the area. Among five higher secondary co-education schools under Tarakeswar block, Ramnagar Noot Behari Pal Chowdhury High School has been selected for the study. The school caters highest number of students among the five. The present school- based cross sectional study was conducted among students of class VI-XII of academic year 2014-15 (May 2014 to April 2015). A total of 761 students in the age group of 10-18 years were participated in the study of which 61.4% were boys and rests were girls.

Ethical consideration was taken from the Institutional Ethics Committee of All India Institute of Hygiene and Public Health prior to the study. After taking permission from school authority and consent from each participant; they were explained the purpose of the study. All willing students present in the class/section on the day of questionnaire data collection were also subjected to anthropometric measurements and blood pressure examination using standard operating procedures. Information collected was recorded in a predesigned schedule. Any participant having any physical disabilities and congenital anomalies were excluded from the study.

The questionnaire was designed as a booklet in Bengali language with instructions based on WHO STEPS methodology [1] and WHO Global School-based Student Survey [2] with some

modification to use in class-room setting to collect information from students regarding the presence of risk factors of non-communicable diseases. Face validity of each item and content validity of each domain was ascertained by a group of experts in AIIIH and PH, Kolkata. Prior to the study, the questionnaire was pretested on students of a different school of the same block.

Age, height and weight were recorded in year, centimetre and kilogram respectively. BMI was categorized by WHO Z score [3]. BP was categorized by National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents. Guidelines for age 10-17 years [4], JNC VII for age 18 years [5] .Age was verified from school record book. Data were entered into a spread sheet and exported to Statistical Package for the Social Science® (SPSS) for Windows, version 16.0 software for analysis.

RESULTS

Table 1: Sex-wise distribution of students according to age group (n=761)

Age group (years)	Boys No (%)	Girls No (%)	Total No (%)
10-12	142(30.4)	94(32)	236(31)
13-15	215(46)	123(41.8)	338(44.4)
16-18	110(23.6)	77(26.2)	187(24.6)
Total	**467(100)**	**294(100)**	**761(100)**

Students in the age group of 10-12 years, 13-15years and 16-18 years were 31%, 44.4% and 24.6% respectively.

Table 2: Sex–wise distribution of students according of BMI (WHO Z score) (n=761)

BMI (category)	Boys No (%)	Girls No (%)	Total No (%)
Thinness	103(22.1)	44(15)	147(19.3)
Normal	305(65.3)	216(73.5)	521(68.5)
Overweight	42(9)	27(9.2)	69(9.1)
Obesity	17(3.6)	7(2.4)	24(3.2)
Total	**467(100)**	**294(100)**	**761(100)**

Increased body mass index (BMI >+1SD) was found to be present in 12.3% of students and 3.2 % of students were suffering from obesity (BMI >+2SD). Increased body mass index among boys and girls were 12.6% and 11.6% were respectively.

Table 3: Distribution of BMI according to age group (n=761)

Age group in years	Thinness No (%)	Normal No (%)	Overweight No (%)	Obesity No (%)
10-12	48(20.3)	148(62.7)	24(10.2)	16(6.8)
13-15	64(18.9)	240(71)	28(8.3)	6(1.8)
16-18	35(18.7)	133(71.1)	17(7.9)	2(1.1)

Age group-wise 6.8%, 1.8% and 1.1% students of 10-12 years, 13-15 years and 16-18 years were obese.

Table 4: Distribution of risk factors for non-communicable diseases according to sex

Risk factors of non-communicable diseases	Boys (n=467) No (%)	Girls (n=294) No (%)	Total (n=761) No (%)
Fruits and vegetables < 5 times/week	92(19.7)	49(16.7)	141(18.5)
Fast food >3 times/week	164(35.1)	93(31.6)	257(33.8)
Extra salt intake in food	257(55)	159(54.1)	416(54.7)
Tobacco use in the past 30 days	106(22.7)	3(1)	109(14.3)
Alcohol consumption in the past 30 days	46(9.9)	2(0.7)	48(6.3)
Less physical activity	101(21.6)	161(54.8)	262(34.4)
Family history of non-communicable diseases	161(34.5)	102(34.7)	263(34.6)
Hypertension and pre hypertension	93(19.9)	65(22.1)	158(20.8)
Overweight and obesity	59(12.6)	34(11.6)	93(12.2)

Most common risk factor was 'intake of extra salt with food' (54.7%), followed by fast food intake >3 times/week (33.8%).

Table 5: Correlates of increased body mass index; Bivariate and Multivariate analysis (n=761)

Variables(referent)	Increased body mass index	
	O.R. (95 % C.I.)	A.O.R. (95 % C.I.)
Age (≤ 15 years)	0.72 (0.45-1.16)	0.72 (0.43-1.22)
Sex(Girls)	1.11 (0.71-1.73)	1.59 (0.96-2.65)
Fruits and vegetables (≥ 5 times/week)	0.83 (0.46-1.49)	0.86 (0.46-1.58)
Fast food(≤3 times/week)	1.92** (1.24-2.97)	1.83** (1.16-2.89)
Extra salt intake in food(No)	1.06 (0.68-1.64)	1.04 (0.66-1.65)
Tobacco use(No)	0.53 (0.25-1.12)	0.58 (0.25-1.35)
Alcohol consumption(No)	0.64 (0.22-1.82)	0.73 (0.22-2.44)
Physical activity (Active)	1.86** (1.20-2.87)	1.94** (1.19-3.17)
Family history of non-communicable diseases(No)	1.23 (0.79-1.92)	1.20 (0.76-1.91)
High blood pressure (No)	2.53*** (1.59-4.02)	2.40*** (1.47-3.92)

$*P < 0.05; **P < 0.01; ***P < 0.001.$

In Bivariate logistic regression analysis fast food intake (>3 times/week) (OR=1.92), less physical activity (OR=1.86), high blood pressure (OR=2.53) were significantly associated with increased body mass index. In Multivariate logistic regression analysis fast food intake (AOR=1.83), less physical activity (AOR= 1.94), high blood pressure (AOR=2.40) remains significant predictor.

DISCUSSION

The present school-based study on risk factors of non-communicable diseases among students has documented a high risk factor profile for non-communicable diseases among students.

Table 3 found increased body mass index (BMI >+1SD) was found to be present in 12.3% of students and 3.2 % of students were suffering from obesity (BMI >+2SD). Increased body mass index among boys and girls were 12.6% and 11.6% were respectively.

Table 4 found age group-wise 6.8%, 1.8% and 1.1% students of 10-12 years, 13-15 years and 16-18 years were obese.

GSHS (CBSE) fact sheet[6] revelled that overweight 10.8% (boys 11.6% and girls 9.7) and obese 2.1% (boys 2.5% and girls 1.5%).Singh A K et al. [7] (2006)18.6% boys and 16.5% girls were overweight or obese, Jain S, et al.[8] (2010) prevalence of overweight and obesity was found to be

19.7% and 5.3% in girls and 18.36% and 10.82% in boys, Kumar D. [9] (2011) the prevalence of overweight (urban 12% vs. Rural 8.8%) was more among urban students, Preetam B M et al. [10] (2011) the prevalence of overweight (≥85 percentile) among children was 4.41% and prevalence of obesity (>95 percentile) was 2.12%, Jain A et al. [11] (2012) only two students were found to have BMI more than 25 kg/m², both were females, Marwah P et.al. [12] (2012) overall obesity was seen in 7.6% children, Chaitanya Gujjarlapudi et al.[13] (2013) The combined prevalence of overweight and obesity was 6.1%.The prevalence of overweight and obesity was 4.3% and 1.7% respectively. Anitha Rani, et al.[14] (2013) among the students, 6.2% were overweight and 5.2% were obese, Watharkar A. et al.[15] (2015) the prevalence of obesity and overweight was 3.97% and 9.80% respectively.

Table 5 found in Bivariate analysis fast food intake (>3 times/week) (OR=1.92), less physical activity (OR=1.86), high blood pressure (OR=2.53) were significantly associated with increased body mass index. In Multivariate analysis fast food intake (AOR=1.83), less physical activity (AOR= 1.94), high blood pressure (AOR=2.40) remains significant predictor. In similar study Singh A K et al. [16] (2006) found that body mass index was negatively correlated with fast food consumption, Jain S, et al .[17] (2010) found obesity was significantly associated with high intake of junk foods (P < 0.05), lower physical activity (P < 0.05), Khan M I, et al.[18] (2010) found the family history of hypertension in boys were associated significantly with overweight and obesity, Kumar D.[9](2011) found history of diabetes mellitus in any of the parents was a significant risk factor for the students to be overweight (OR = 2.30), Marwah P et.al. [12] (2012) found intake of high calorie foods, physical inactivity were significant risk factors of obesity (p<0.001), Watharkar A. et al. [15] (2015) found consumption of fast foods regularly; low

levels of physical activity were significantly associated with overweight and obesity.

The cross-sectional study was conducted in a single school of Tarakeswar Block of Hooghly District. Results are not representative of the district or the block. It would have been better if prevalence of raised blood glucose, raised cholesterol and abnormal lipid profile also were included in the study.

Quality of collected information through questionnaire on dietary behaviour of participants such as frequency of intake of fruits and vegetables, fast food intake, intake of extra salt intake with food etc. had some inherent limitation due to recall bias which is very much dependent on age of the participant, gender, intelligence, mood, attention, and consistency of eating pattern etc.

As information regarding health related practices were self-reported by the participants there is a possibility that sensitive and socially undesirable responses like smoking habit, alcohol intake etc., might have been underreported though the assurance made by the researcher regarding maintenance of anonymity and confidentiality of the data.

CONCLUSION

Therefore, it is strongly felt that all efforts must be made to obviate the risk factors of overweight and obesity among the general mass at a very early age. Those efforts must be well structured, scientifically systematized and socially implementable.

Calculation and interpretation of BMI to understand risk status of own body weight can easily be taught in school set up and may be incorporated in school curriculum. Schools should promote regular physical activities of students through games, sports and other recreational activities. Health workers, who are the mainstay of the health care delivery system, need to be sensitized on the nature, magnitude, complications and social consequences of obesity. Capacity building for health workers and other categories of

health care providers for prevention of emergence of risk factors, early identification of persons at risk, and life style modification interventions by trained health work force should be at the top of national health care agenda.

It was observed that health education programmes are essential because culture, habit and tradition of the society go through a rapid change. The society will be built up in such a way that all risk factors will be totally exterminated, thus ensuring the reduction of the burden of the cost of diagnosis, management and rehabilitation of non-communicable disease at large.

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